Stormwater Pollution Prevention

Engaging Employees at NASA's Goddard Space Flight Center (GSFC)

Lori Levine
Lori.M.Levine@nasa.gov

Goddard's Place in the Bay

GSFC's Water Permits

NPDES Discharges from Tanks, Pipes, and Other Liquid Containment Structures –

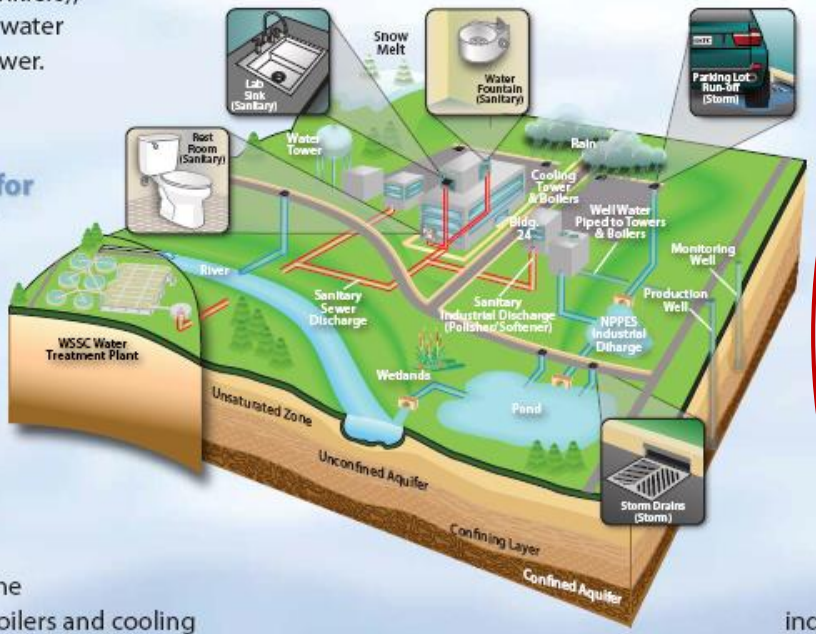
Required for specific functions discharging to the storm sewer system. These include maintenance of fire-fighting equipment (hydrants, fire pumps, building sprinklers), flushing of new/repaired domestic water lines, and discharge of the water tower.

NPDES General Permit for Construction Activity –

Required for construction activity disturbing more than one acre to ensure adequate erosion and sediment controls.

WSSC Discharge Authorization –

Required in order to discharge industrial process wastewaters to the sanitary sewer. Processes include boilers and cooling towers only when source water is domestic water; polisher/softener; laboratories.



State Water Appropriation –

Pertains to production wells used to provide source water for cooling towers and boilers.

NPDES MS4 –

Required for small municipal separate storm sewer systems. Operators develop and implement BMPs and achieve measurable goals in the areas of public education/outreach, public participation, illicit discharge detection and elimination, construction site runoff, post-construction site runoff, and pollution prevention/good housekeeping.

NPDES Industrial Discharge –

Required for specific industrial processes, which discharge pollutants to waters of the State. These include blowdown from the boilers and cooling towers.

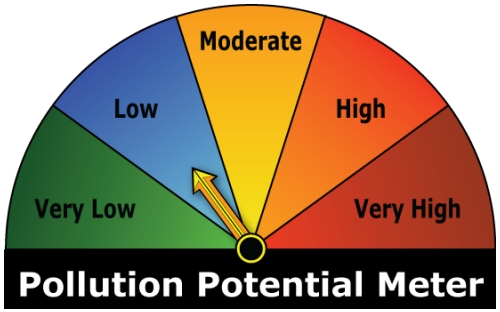
Storm Water Pollution Prevention Plan (SWPPP) Training

- Employees who work in activities identified in the SWPPP are required to take annual GSFC training.
- Online and classroom options.
- The training provides:
    - Activities covered in the SWPPP
    - Activity Coordinator responsibilities
    - Inspection Process
    - Permit requirements
    - Best Management Practices (BMPs)
    - Illicit and Non-stormwater Discharges
    - Spill reporting procedures
- Other stormwater education opportunities are integrated into Center outreach events (e.g., Earth Day).

SWPPP Activities

Activity
Salt Domes
The Logistics Facility and Main Warehouse Loading Docks
Landscaping Facility
Staging and Storage Areas
Potable water discharges
<90-day Waste Accumulation Facility
Auto Tech Center (Auto Club)
Heating and Refrigeration Plants
Vehicle Maintenance Facility
Areas with High Erosion Potential

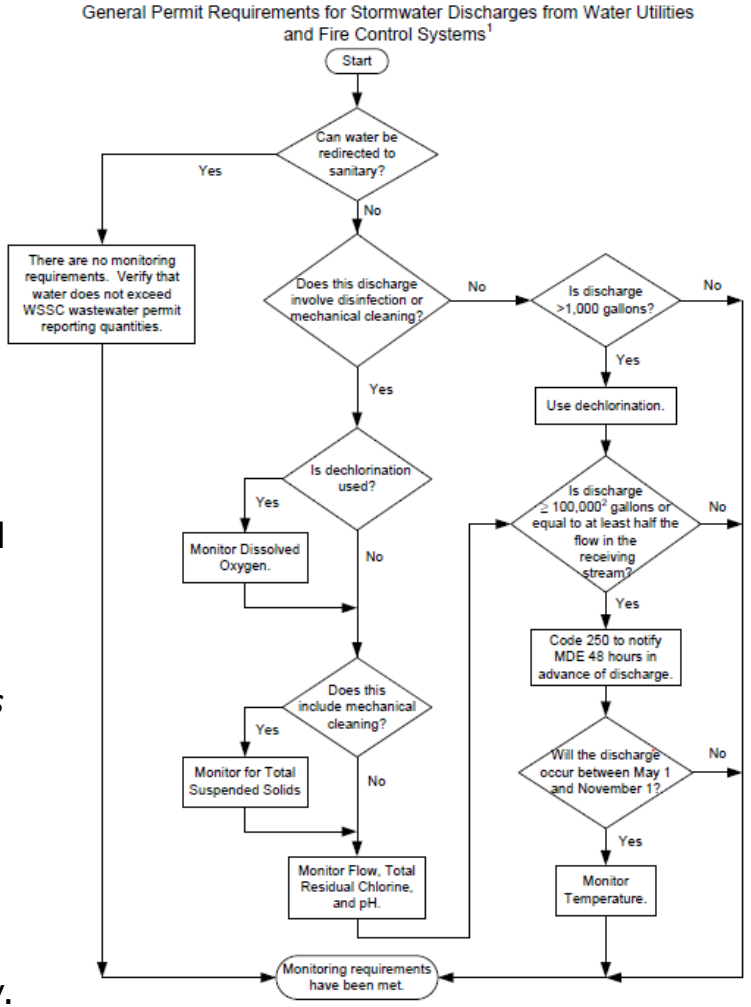
Potable Water Discharges



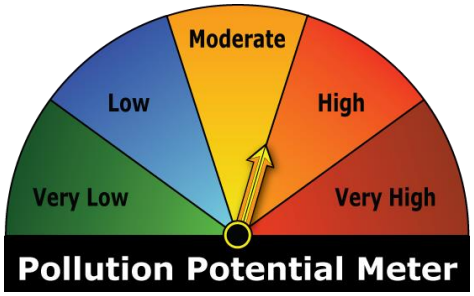
The Center conducts periodic maintenance on firefighting equipment, water distribution lines, and the water tower. All of these systems use domestic (potable) water. Domestic water discharges are governed by the NPDES *General Permit for Discharges from Tanks, Pipes, and Other Liquid Containment Structures at Facilities Other Than Oil Terminals* permit.

The chlorine in domestic water is the primary pollutant of concern. There is also the potential to cause erosion when discharging water at high rates and/or volumes.

BMPs include a combination of redirecting the discharges, dechlorination, and volume control, depending on the activity.



Vehicle Maintenance Facility

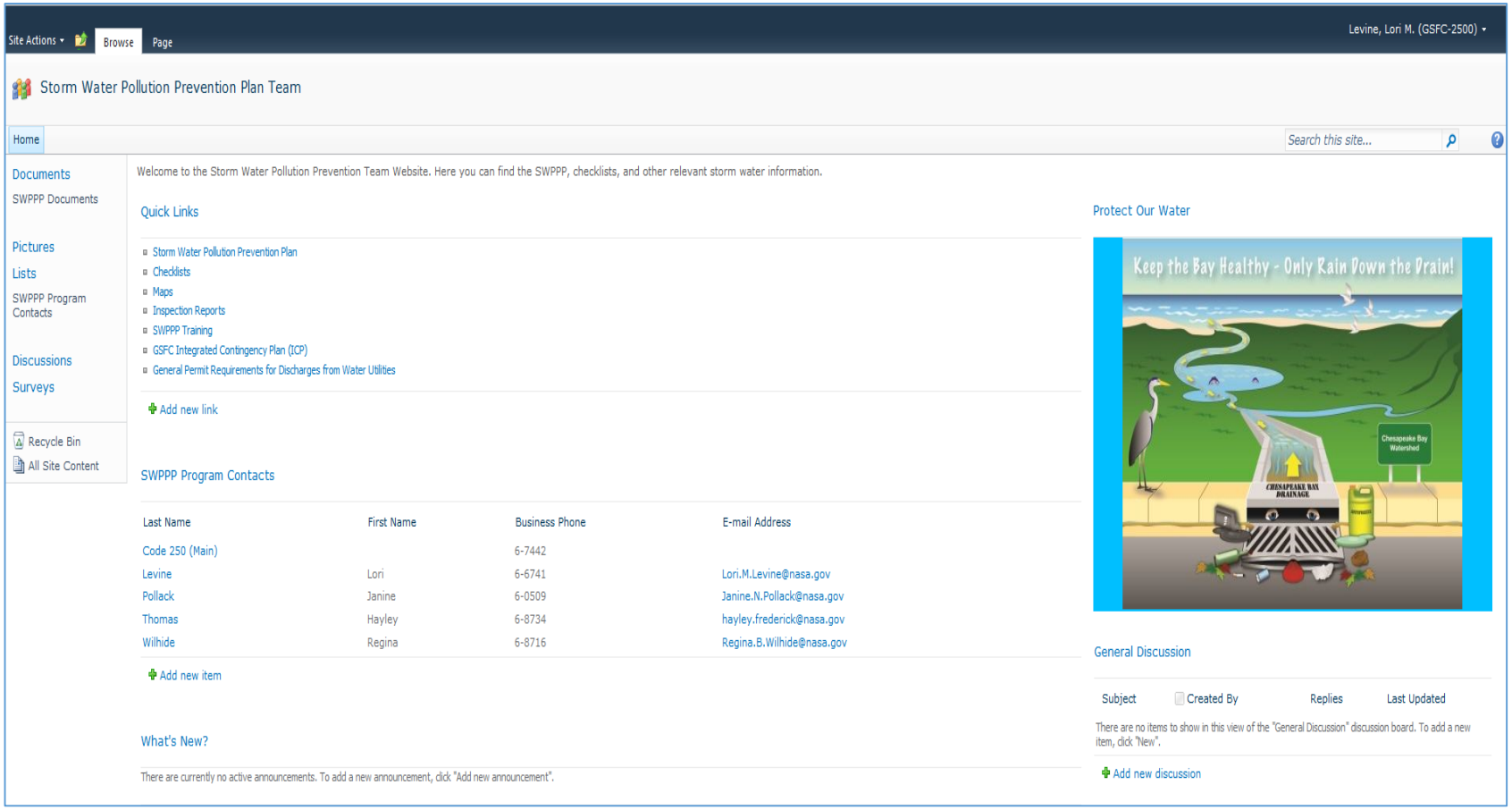


The fueling station lacks full cover. If there were a spill on the south side of the pumps during or shortly before a rainstorm, fuel would be easily carried to waterways.

Activity Coordinator Responsibilities

- Enforce compliance with the SWPPP;
- Conduct routine inspections using a checklist specific to the activity;
- Retain records required by the SWPPP;
- Identify and correct problems and provide timely notification to the Medical and Environmental Management Division;
- Take annual SWPPP training and verify that the subordinates and coworkers have completed it;
- Assist with the annual SWPPP compliance inspection;
- Attend the annual SWPPP Team meeting; and
- Take the GSFC-Greenbelt Integrated Contingency Plan training annually, if required.

SWPPP Team Site

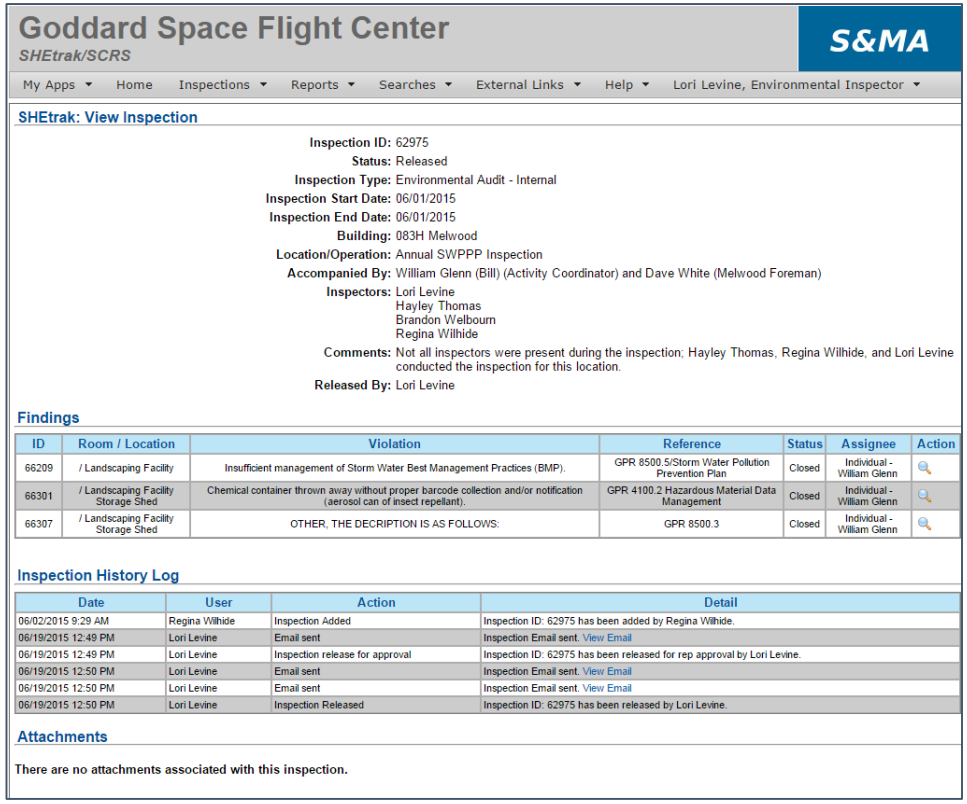


Vehicle Maintenance Facility Checklist (Section 4.1)

YEAR:	JAN				FEB				MAR				APR				MAY				JUN				JUL				AUG				SEP				OCT				NOV				DEC			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Baseline BMPs																																															
Weekly Visual inspections																																															
- Facility (weekly)																																															
* Good Housekeeping																																															
* Preventive Maintenance																																															
* Copies of ICP Available																																															
* Visual Aids on Spill Control																																															
* Spill Kits Available																																															
* Drips/Leaks Contained																																															
* Emergency Numbers/ Notification Procedures Posted																																															
* Spills Reported & Recorded																																															
- Monthly Inspections																																															
* Tanks																																															
* Wells																																															
* Gas Pumps																																															
* Recovery System at Pump																																															
* Alarm System																																															
Advanced BMPs																																															
- Cleanout of oil/water separator (every 6 months)																																															
Training & Recordkeeping																																															
- Maintain records (tank inspection logs, MSDSs, spill log, preventive maintenance, etc.)																																															
- Training annually																																															
NOTES:																																															

SWPPP Compliance Inspections

- Environmental staff inspect SWPPP activities at least annually.
- Findings are assigned to the responsible civil servant and tracked to closure in the Safety, Health, and Environmental Tracking System (SHEtrak).
- Special projects (e.g., construction) are inspected frequently. Issues are tracked in an Access database. Reports are submitted to the Project Management Team for action.



Goddard Space Flight Center
SHEtrak/SCRS
S&MA

My Apps | Home | Inspections | Reports | Searches | External Links | Help | Lori Levine, Environmental Inspector

SHEtrak: View Inspection

Inspection ID: 62975
Status: Released
Inspection Type: Environmental Audit - Internal
Inspection Start Date: 06/01/2015
Inspection End Date: 06/01/2015
Building: 083H Melwood
Location/Operation: Annual SWPPP Inspection
Accompanied By: William Glenn (Bill) (Activity Coordinator) and Dave White (Melwood Foreman)
Inspectors: Lori Levine, Hayley Thomas, Brandon Welbourn, Regina Wilhide
Comments: Not all inspectors were present during the inspection; Hayley Thomas, Regina Wilhide, and Lori Levine conducted the inspection for this location.
Released By: Lori Levine

Findings

ID	Room / Location	Violation	Reference	Status	Assignee	Action
66209	/ Landscaping Facility	Insufficient management of Storm Water Best Management Practices (BMP).	GPR 8500.5/Storm Water Pollution Prevention Plan	Closed	Individual - William Glenn	
66301	/ Landscaping Facility Storage Shed	Chemical container thrown away without proper barcode collection and/or notification (aerosol can of insect repellant).	GPR 4100.2 Hazardous Material Data Management	Closed	Individual - William Glenn	
66307	/ Landscaping Facility Storage Shed	OTHER, THE DECRIPTION IS AS FOLLOWS:	GPR 8500.3	Closed	Individual - William Glenn	

Inspection History Log

Date	User	Action	Detail
06/02/2015 9:29 AM	Regina Wilhide	Inspection Added	Inspection ID: 62975 has been added by Regina Wilhide.
06/19/2015 12:49 PM	Lori Levine	Email sent	Inspection Email sent. View Email
06/19/2015 12:49 PM	Lori Levine	Inspection release for approval	Inspection ID: 62975 has been released for rep approval by Lori Levine.
06/19/2015 12:50 PM	Lori Levine	Email sent	Inspection Email sent. View Email
06/19/2015 12:50 PM	Lori Levine	Email sent	Inspection Email sent. View Email
06/19/2015 12:50 PM	Lori Levine	Inspection Released	Inspection ID: 62975 has been released by Lori Levine.

Attachments

There are no attachments associated with this inspection.

Best Management Practices

BMPs are activities, policies, and procedures that prevent pollution of stormwater. The SWPPP includes the following BMPs:

1. Good Housekeeping,
2. Preventive Maintenance, and
3. Visual Inspections.

Spring maintenance on the bioretention basin

Good Housekeeping

A Good Housekeeping BMP is any activity, policy, procedure, and/or practice that is used to maintain a clean and orderly facility. Examples include:

- Outside areas clean and organized.
- Drips and leaks from equipment or pipes contained and collected.
- Adequate space in work areas to minimize spills.
- Garbage and trash removed regularly.
- Storm drains kept free of debris.
- No evidence of dust from painting, sanding, or other industrial activities.
- Good housekeeping reminders, posters, and inspection schedules posted.
- Spill kits complete and in good condition.

Preventive Maintenance

Involves regular inspections, maintenance, testing, and repair or replacement of facility equipment and systems. Examples of preventive maintenance include the following actions:

- Repair or replace defective equipment and correct problems identified during routine inspections;
- Post preventive maintenance reminders, posters, and inspection schedules;
- Keep inspection records;
- Inspect equipment used to handle potentially polluting materials; and
- Inspect and maintain stormwater management structures regularly.

Visual Inspections (VI)

Meant to be a "look over" of the facility to identify conditions that might pollute storm water runoff. VI's help identify the following:

- Corroded drums
- Drums without plugs or covers
- Corroded or damaged tanks and related equipment
- Torn bags or materials exposed to precipitation
- Leaking pipes, valves, and/or pipe fittings
- Broken/cracked berms, dikes, walls, etc.
- Land conditions (e.g., erosion)
- Water conditions (e.g., oily sheen)
- Clogged or damaged storm drains in vicinity of area

VI's identify inappropriate storage of materials such as shown in the picture above. These chemicals should not be stored outside without cover and secondary containment.

Emergency and illicit Discharges

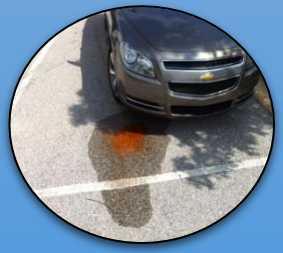
Emergency discharges are unauthorized discharges to the storm drain system that are unavoidable, such as broken steam or sanitary sewer pipes, water tower overfills, etc. They are usually detected and repaired immediately. **Consult with the Code 250 MEMD to determine if an emergency discharge is a reportable release, even if the water is potable or does not seem to present a pollution potential.**

Illicit discharges are discharges that would require a permit, if the discharge were intentional. Illicit discharges at GSFC occur when there is a failure or rupture in the system that cannot be readily repaired. Corrective actions for illicit discharges are tracked and reported to the State of Maryland under the requirements of GSFC's NPDES Municipal Separate Storm Sewer Systems (MS4) permit.

Notify the Medical and Environmental Management Division (MEMD) of all emergency and illicit discharges. The MEMD will report emergency discharges with pollution potential to the Maryland Department of the Environment.

Spills

GSFC strives to reduce the chance of spills or releases of harmful chemicals or materials to the storm sewer system; however, accidents happen. All spills, including oil leaks from vehicles traveling on Center (personal, contractor, and government vehicles), must be reported immediately so that appropriate regulatory reporting and clean up can be accomplished. Examples of reportable spills or releases include the following:



Antifreeze or oil leaking from a car

Hydraulic fluid leaking from heavy equipment

Improper storage of materials or leaking materials

Sewage or domestic water releases from line breaks or overflows.

Areas with High Erosion Potential

Spillway repair

Before

After

Erosion & Sediment Control (E&SC)

Sediment in storm water runoff transports pollutants into waterways. The State of Maryland has regulations in place to protect water from sediment loading. All construction projects that expose soil at GSFC must comply with Maryland's most recent E&SC standards and specifications.

In this picture, notice the erosion and accumulated sediment at the outfall. Proper controls must be installed to fix erosion and prevent sediment buildup/ runoff.

E&SC, Continued

Turbid runoff is not permitted to flow off of the construction site.

Silt fences must be:

- Inspected and maintained.
- Used for their intended purposes (i.e., not to control water, but to *filter and contain sediment).*

Fences cannot have sediment buildup ≥25% of the fencing height.

Storm drains must be protected and controls cleaned/repaired after rain events to prevent clogging.

Non-Stormwater Discharges (NSWD)

An NSWD is any flow that does not consist entirely of stormwater.

- **Identify activities that could cause NSWDs**, such as:
  - Dewatering operations
  - Illicit connections and discharges (solid or liquids)
  - Vehicle and equipment fueling (spills)
  - Washing vehicles and equipment
  - Storage and staging area materials
  - Construction wastes
  - Construction site exits & offsite vehicle tracking
- **Implement controls.**

Concrete washout water

Sediment

What goes wrong? BMPs…

- Not implemented.
- Not maintained (check after storm events).
- Do not function as designed.
- Not adapted for changing site conditions.
- No implementation of inspection recommendations and finding closure.
- Evidence of runoff from site.

Communicating Our Impact

Where does runoff from Goddard go?

From Here

To Here

To Here

General Outreach

Environmental Bulletin

National Aeronautics and Space Administration

October 2012

Leave the Leaves

Let Nature Do the Work

Picture this: it's a crisp, clear fall day. You head outside with your mug of hot apple cider to enjoy the beautiful weather and watch the leaves fall gently from the trees. Suddenly, the idyll is destroyed by the droning of leaf blowers. You head back indoors. Maybe you should put down that mug and get to work raking and bagging the leaves in your own yard. Or should you? Wouldn't you rather save your back, your hands, and your hearing and go do something fun instead? You can, and not feel guilty about it. Leave the leaves in your yard and experience the benefits leaf litter provides for your lawn, garden, and wildlife.

Enrich Your Soil, Garden, and Lawn

Raking and bagging your leaves is not only a waste of time, it's a waste of money. In forests where leaves are left where they land, the fertile soil teems with beneficial microbes, fungi, and bacteria. Decomposing leaves help create a rich organic topsoil. You won't need to waste money on artificial fertilizers or compost to replenish your soil and lawn in the spring when you have a free, nitrogen-rich source dropping from the trees every year. If you love to garden, but hate weeding, leaves are your best friend. A healthy layer left on garden beds reduces weeds and keeps the soil moist for the plants you do want. Just be sure not to layer them too heavily on top of your plants. Place shredded leaves in sensitive areas instead. By "bagging" the leaf bags, you will save more than time and money for yourself; you'd also be conserving resources by lessening the need for yard waste collection by gas-guzzling waste trucks, and you'd reduce the energy needed to process this waste at a landfill or composting facility.

http://fresh-basil.com/

Your Toilet Doesn't Have Bronchitis…

Don't Rush to Flush

Have you finally kicked this season's flu? Sinusitis (or any other "itis") lost its grip as well? Did your knee surgery leave you with a new lease on life and a jammed medicine cabinet? Your first inclination may be to flush your unwanted pills down the toilet or sink. After all, you don't want your pets sifting through them in the trash. Your line of reasoning says your prescriptions and over-the-counter drugs go to a waste water treatment plant (WWTP), which should be able to take care of this. It's a win-win situation, right? Unfortunately, it's not that simple. According to Maryland's Department of the Environment, new technology has been able to detect trace amounts of these pharmaceuticals in local waterways. Currently, WWTP's are not able to *remove* such trace amounts of pharmaceuticals before discharging them into local waterways. As a result, these pharmaceuticals enter the watershed and fall into the pollutant category "pharmaceuticals and personal care products" (PPCPs).

National Aeronautics and Space Administration

A General Guide to Stormwater at GSFC

GSFC environmental bulletin

Stormwater, a Loaded Word

It begins modestly, as anything made of water falling from the sky. It can fall gently or ferociously, in a slurry, frozen, or room temperature. Either way it falls, stormwater ends up loaded. The loading occurs as runoff from land, rooftops, and other impervious surfaces carries a mix of oil and grease, fertilizer, sediment, etc., into storm drains and surface waters. In undeveloped areas, stormwater infiltrates the ground and replenishes aquifers, is absorbed by plants, or meanders across the landscape to surface waters. In developed areas, impervious surfaces, such as roof tops, parking lots, walkways, and roads prevent stormwater from infiltrating the ground. In a recent study conducted by the US Geological Survey it was determined that even the addition of ten percent impervious surface in an undeveloped area, can cause a significant decline in aquatic life.

Stormwater Regulations at GSFC

GSFC holds an individual National Pollutant Discharge Elimination System (NPDES) permit and a General Permit for Discharges from Small Municipal Separate Storm Sewer Systems (MS4s). GSFC's NPDES permit, issued by the Maryland Department of the Environment (MDE), requires the Center to develop and implement a Stormwater Pollution Prevention Plan (SWPPP), which describes practices to be used to reduce the pollutants in stormwater discharges associated with industrial activity. GSFC's MS4 requires the Center to develop and implement best management practices (BMPs) and achieve measurable goals. These measures reduce the amount of pollutants in stormwater runoff discharged into local receiving waters.

www.nasa.gov

Outreach Activities

NASA Goddard Child Development Center rain garden

Summary

"If it didn't come from the sky, it can't go down the drain."

- A robust education and outreach program informs and engages employees.
- Adapt training to address common findings or compliance concerns.
- Delegate inspection requirements to personnel responsible for activities.
- Verify compliance.